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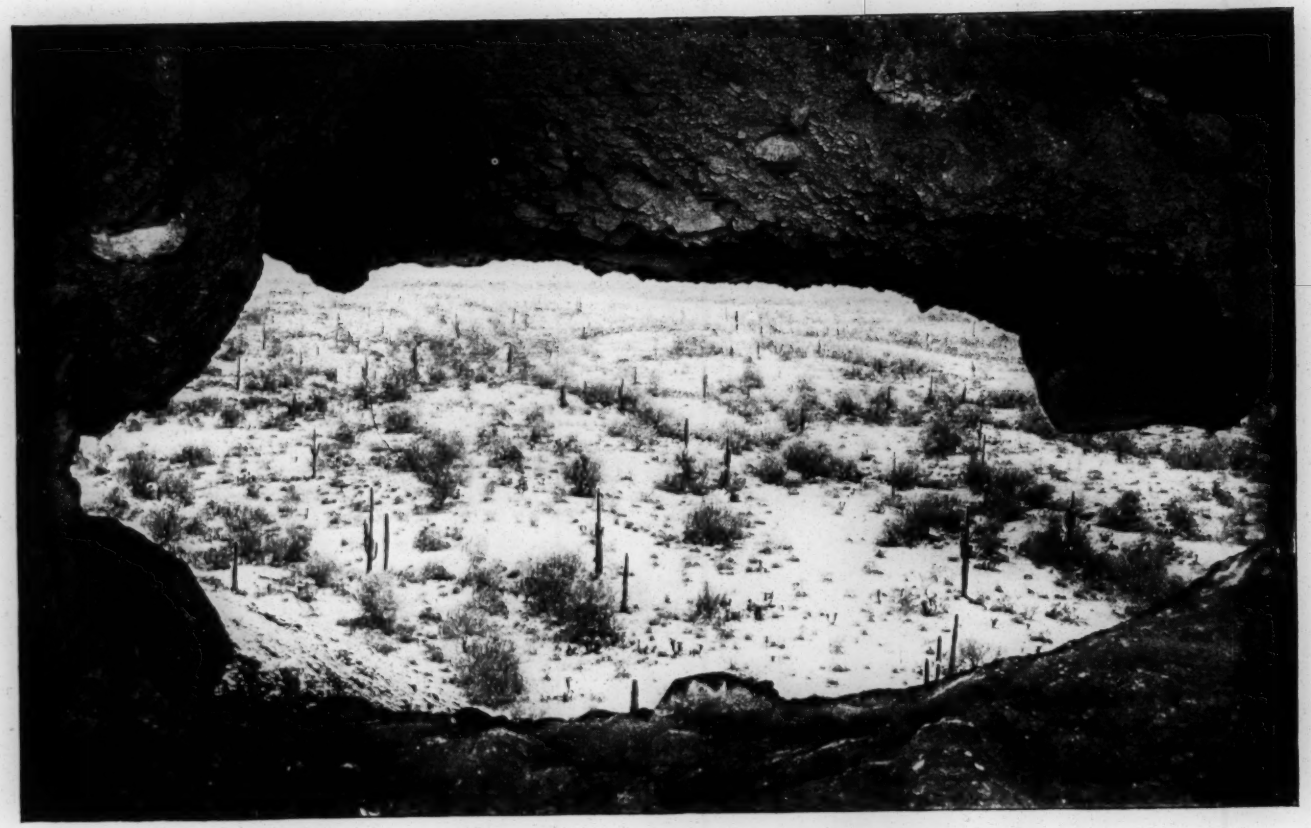


VIEW FROM "HOLE IN THE MOUNTAIN" NEAR TEMPE, ARIZONA (TYPICAL SUB-DESERT LANDSCAPE)

THE

National Geographic Magazine

VOL. IX AUGUST, 1898 No. 8

PAPAGUERIA

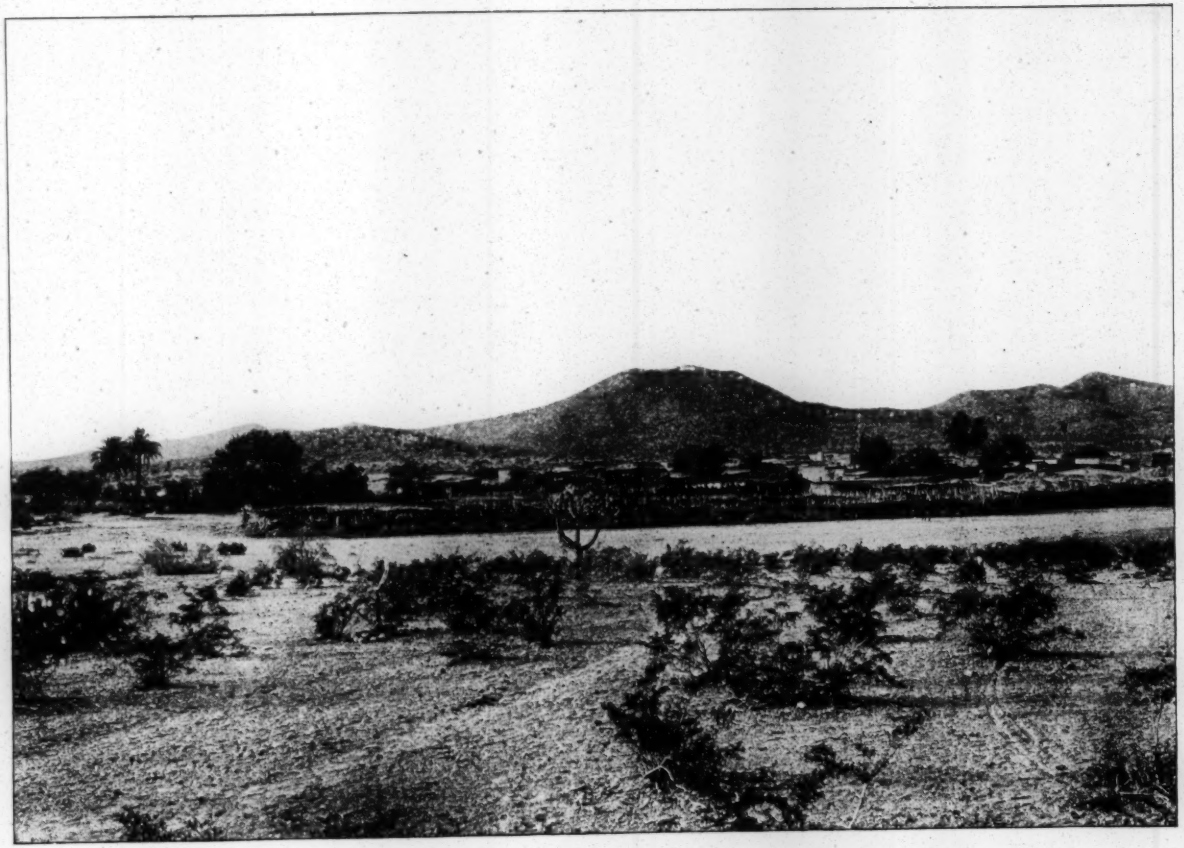
By W J McGEE,

Bureau of American Ethnology

Following a custom which became well established in the days of Mexican colonization, the priestly pioneers called the arid region beyond the Sierra Madre mountains *Papagueria—i. e.*, the Land of the Papago—from the tribe of Indians native to the country; and in time the tribesmen, and after them the American and Mexican settlers on their border, adopted the designation. The district lies south of Gila river and southwest of the Sierra Madre, in what is now Arizona and Sonora, and is bounded on the southwest by the Gulf of California and on the south by the ill-defined district known as Seriland; it is some 200 miles wide in the north, narrowing somewhat southward, and over 300 miles in length from north-northwest to south-southeast, the area reaching over 50,000 square miles, or about that of New York or Iowa. The larger part of the district lies in Mexico, in the state of Sonora, though the greater part of the aboriginal population is gathered in the northern portion, within the territory of Arizona.

The Papago Indians (Pa-paf′ in their own language*) are, in distinctiveness and persistence of characters if not in population,

*Their proper name in their own language is Aw′-aw-tum (Men, or People), while the name by which they were known to neighboring tribes of their own and other linguistic stocks is that of a legume cultivated and consumed by them in prehistoric times and later; this, in the Piman dialects, is called "paf" in the singular, "pa-paf′" in the plural, so that the literal designation of the tribe may be rendered "Beans." Since the same term is applied to the field in which the legumes are grown, the term might be considered to mean "Bean-patch;" but in reality it means "Bean people," the second element being understood. This alien designation was apparently used



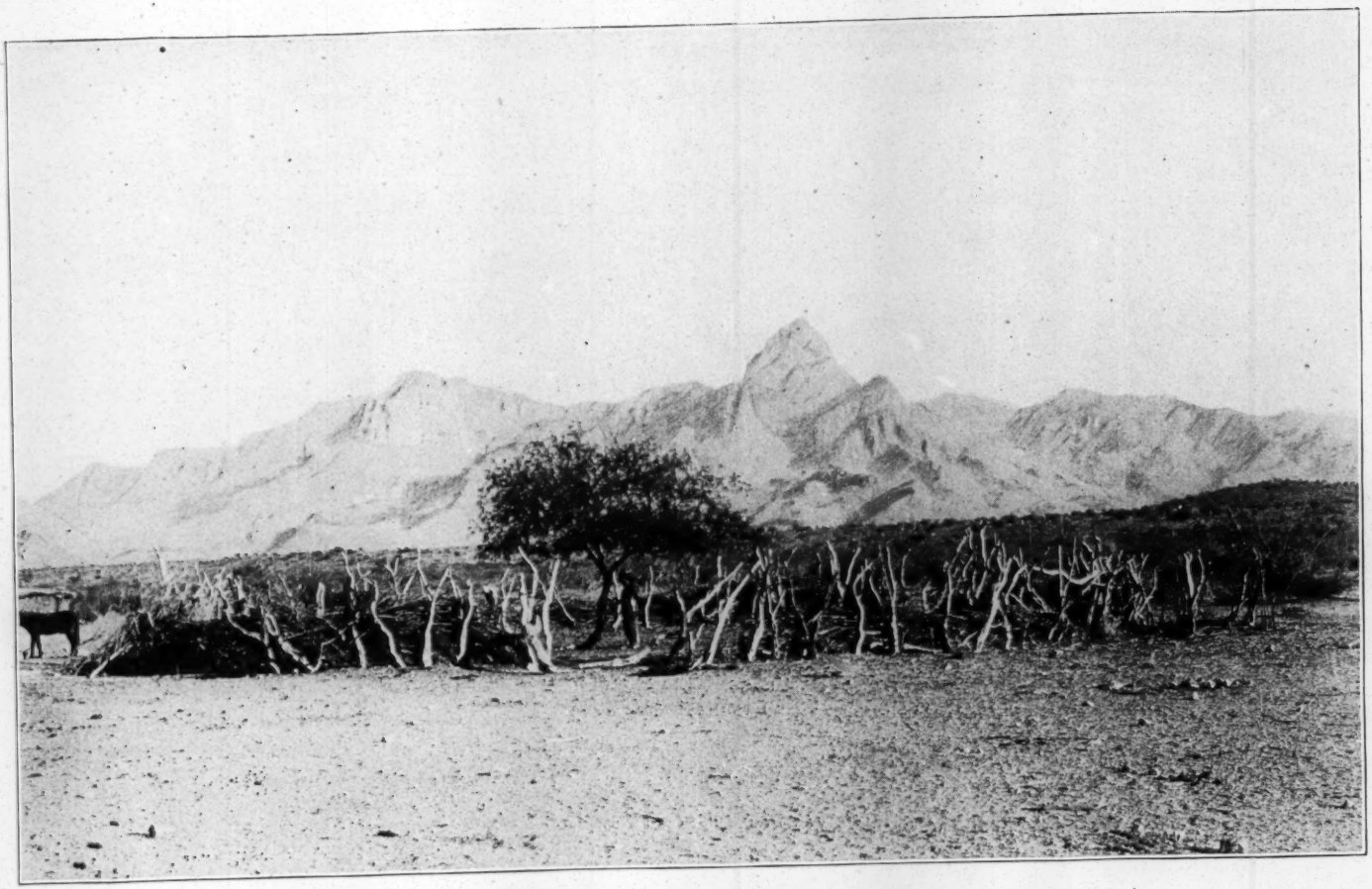
CIENEGA: MEXICAN-INDIAN VILLAGE OF PAPAGUERIA

the leading branch of the Piman stock or linguistic family. According to several authorities, the Piman is related to the Nahuatlan of Mexico, the great and highly advanced stock of the Montezumas. Besides the Papago, the Piman group includes the Pima tribe of southwestern Arizona, the Opata of the border, and four or five tribes altogether in Mexico. The Opata have been assimilated by the Mexicans, and the Pima Indians are largely gathered on reservations; the Papago remain distinct, and while a small number are domiciled on the reservation at San Xavier (near Tucson) the greater part of the tribe retain their independence and essential autonomy.

The Papago population within the limits of the United States in 1890 was 5,163, according to the census of that year. These figures were based largely on estimates. The population estimate for the entire tribe made during the explorations by the Bureau of American Ethnology in 1894 and 1895 was 4,000, of whom ten to forty per cent, according to the season, are in Mexico.

Papagueria is perhaps the most arid region on the continent. The surface slopes southwestward from the imposing Sierra Madre with its subordinate ranges, and is relieved by many lesser ranges generally trending parallel with the main chain. As the vapor-laden air drifts from the Pacific and the gulf over the sun-parched land it is heated to dryness; but about midsummer and again about midwinter the air is chilled again as it drifts over main or minor crests, and fierce storms occur in the mountains and occasionally sweep into the plains. The annual precipitation along the margin of the Sierra is recorded as 15 inches, and in the higher portions it probably reaches 20 inches; but it quickly diminishes westward to 10 inches, to 5 inches, then to a trifling or unmeasurable amount representing the product of local storms, perhaps separated by intervals of years, the average rainfall throughout Papagueria probably falling short of 5 inches. Thus the greater part of the district is practically a desert, although, as in most other American deserts, vegetal and animal life maintains a feeble existence. The high Sierra is scantily clothed with pines, and at lower levels gnarled, scrubby, and thorny oaks and chaparral thickets occur sparingly. In the val-

by the tribe in their dealings with their neighbors, and so came into use among the Spanish priests and settlers; and in time the Mexican users of the term lost the soft final and then emphasized the terminal vowel and, when they came to write it, strengthened the vowel sound still further by introducing the semi-silent but sub-guttural *g* of the Andalusian. This orthography has been adopted by Americans and the pronunciation modified to fit, though the local Mexican pronunciation is hardly distinguishable from that of the Indians themselves.



BABOQUIRERA PEAK, SEEN FROM FRESNAL (SHOWING THE RUGGEDNESS OF A TYPICAL RANGE RISING FROM A PLAIN)

leys the deep-rooted mesquite dots the surface in similitude of scattered and ill-kept orchards, or gathers with a dozen other trees in scraggy forests along permanent waterways, while monstrous bizarre cacti haunt the foothills and the lower slopes, and scattered grass-blades faintly tinge the acres intervening between cacti and mesquites. The plant forms abound in pulpy structures and impervious rinds for conserving moisture, even more than in thorns and other protective devices; for in this hard region the struggle for existence is not so much between organism and organism as between organism and environment, and the organisms persist less by the multiplication of progeny than by the prolongation of individual life. Animal life, in insect, reptile, bird, and mammal, occurs in much the same proportion to vegetal life as in humid regions, but is more largely nocturnal and crepuscular. Ants of many kinds (including the ingenious and successful farmer ant), wasps, flies, and other insects follow the sparse flora. Gaudy and swift efts, as well as somber and sluggish lizards, accompany the insects, while ground-squirrels and field-mice contribute a quota of vitality. In the more humid valleys, and on the mountain sides moistened by drainage from above, rabbits, quail, deer, and other herbivorous and graminivorous things collect in limited numbers, while serpents find subsistence in the more fertile spots; and over the hills, valleys, and plains on which lower life prevails the coyote on the land, and hawks, owls, and eagles in the air, are not wanting (for it is only in the western part of Papagueria, where the rainfall is trifling, that life is unable to hold its own). Yet, as among plants, the struggle of animal life against inorganic nature and alien organisms is severe, and an exceptional number of the animate things are armed with mandibles, stings, fangs, talons, poison glands, and other protective devices. The distribution of life conforms to the distribution of water; it is most abundant over the rugged summits and rocky slopes of the high Sierra, as well as along the gulches and gorges—barrancas of the local vernacular—of the foot slopes and the broad sand washes or arroyas of the narrower valleys; it is less abundant on the foothills and over the lower ranges, where the storms are feebler and rarer; it is still more meager over the broad intermontane valleys constituting the greater part of Papagueria; but it is only in the western portion of the district, where clouds rarely gather and whither streams never flow, that the shifting sands and black-burned scoriæ of dead volcanoes (the "mal-pais" of the Mexicans) are utterly barren.

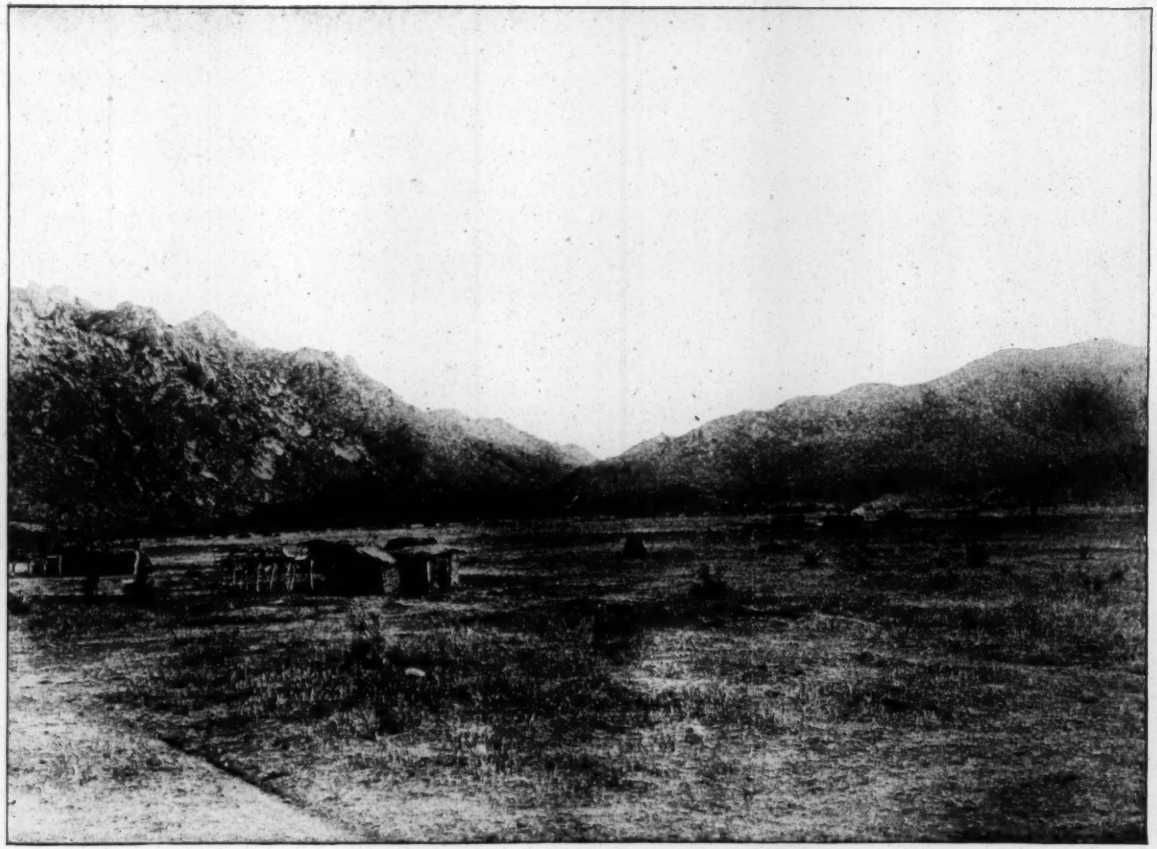
The distribution of water in Papagueria is correlated with the configuration of the surface. As the vapor-charged air drifts up the long slope to the base of the Sierra and up the steeper slope toward the crest, a part of the vapor distills as dew or falls as rain, while the lesser ranges lying athwart the long slope extract a part of the boon; so there are storm-fed streams in all of the higher mountains, rushing torrents in the lofty Sierra, slender streams in the lower ranges, and a part of the flood soaks into the thirsty soil to form ground water, which may reappear as springs toward the mountain bases or in the narrow upland valleys. During the midsummer storms, and still more during those of midwinter, the mountain-born floods stretch far into the plains, cutting channels broad and deep as those of the Connecticut, Susquehanna, and Savannah, which for eight or ten or eleven months of the year are naught but wastes of burning sand. The typical drainage system of Papagueria during the wet season is a long series of nearly parallel mountain torrents flowing down the side of the range in deep gorges, joining in part in the foothills, and finally uniting in the adjacent plain as vast sheetfloods, miles in width and inches in depth, flowing swiftly and boldly adown or athwart the broad valleys toward the sea, to finally gather in great rivers; yet throughout the whole district these broad streams are quickly swallowed by the sands or consumed by the blistering air, and from the Gila to the Yaki, 500 miles away, no river of Papagueria has reached the sea during the memory of men. As the dry season approaches the rivers are cut off in their lower reaches, mile by mile, and as they shrink toward their sources the drainage systems contract and most disappear, leaving a few slender streamlets in the deeper gorges each heading in a spring or seepage basin and rippling feebly over the sands a few rods or miles before fading in the sun; and so delicate is the adjustment of climate and earth-water that the streams stretch by night and shrink by day, sometimes for miles. A few streams heading in the high Sierra indeed flow for scores of miles; but these have mainly been taken by other peoples and hardly appertain to Papagueria. There are other streams which, during the dry season, are practically subterranean, and only to be found in storm-cut tinajas or reached by digging. And all the way from the high Sierra toward the gulf, over the lessening mountains and toward the broadening plains, earth-water on the surface or at depths grows scantier and scantier until it is gone.

RIO SECO: A TYPICAL SANDWASH OF PAPAGUERIA (MUMMY OF FAMISHED COW IN FOREGROUND)

This characteristic waterflow has reacted on the topography during the eons of geologic history, and has developed a configuration no less distinctive than the drainage systems. To the traveler by rail along the northern border of Papagueria the region seems one of remarkably rugose and irregular mountain ranges, buttes, picachos, and precipice-walled mesas; for the jagged mountains are always in sight and the clear air brings them close to the eye. At first the traveler in the saddle sees the region in similar light, the exceeding ruggedness of the mountains giving them undue prominence; but after spending days in traversing the intermontane plains and hours in crossing or circumscribing ranges and mesas for a month or two he learns to see the land-forms in true proportion, and finds that only a fifth or a tenth of the surface is mountain and four-fifths or nine-tenths plain or valley so smooth as easily to be traversed by pack-animals, and for the most part by wheels. So rugged are the mountains and so smooth the plains that the region has been likened by a careful observer to a series of great ranges buried to their ears in alluvial deposits; yet more thoughtful study shows that half the area of the plains is smoothly planed rock similar to that of the mountains, the planing being the work of the sheetfloods into which the freshet waters gather. In general, the plains incline toward the great trough half filled with the waters of the Californian gulf; and, on crossing the northwesterly-southeasterly trending ranges toward the gulf, each intermontane plain is found to lie lower than the last, down to the tide-swept shore. This inclination is a part of that southwestward tilting which accompanied the uplifting of the great plateau region and the birth of the Colorado canyon. In arid Papagueria, where the work of the feeble streams is long drawn out, it has resulted in a regressive erosion, whereby the streams flowing southward and westward have cut far into and often through the ranges in which the waters gather, pushing the divides into the plains beyond. The habitability of Papagueria is largely due to this fact, for it is only in the narrow gorges cut into and through the ranges by regressive stream-work that the scant ground-water approaches the surface in springs or seepage from the sand-washes.*

The Papago Indians, primitive and present holders of this district, are preëminently children of the desert. So strongly ad-

*The topography and its development in this interesting region are set forth in greater fullness in "Sheetflood Erosion" (Bull. Geol. Soc. Am., vol. 8, 1897, pp. 87–112).



COYOTE: PAPAGO VILLAGE (SHOWING ABRUPT TRANSITION FROM SMOOTH PLAIN TO RUGGED MOUNTAIN)

verse are the physical conditions of life that the struggle for existence among plants and animals is modified, all striving against inorganic nature rather than against each other; and this peculiar strife has led to a coöperation among unrelated organisms so complete that the district is segregated into a series of colonies in which grasses, trees, cacti, insects, reptiles, birds, and mammals dwell together in harmony and mutual helpfulness. It is in part through this system of coöperation or communality that life is enabled to exist throughout the region. Now just as the lower organisms have become fitted to an adverse physical environment and adjusted to each other, so the Papago Indian has, through the generations, developed fitness to his desert habitat—he has joined the general system of communality, and lives in harmony with the desert flora and the desert fauna in a land so bitterly inhospitable that marauding Apache, pastoral Mexican, and gold-seeking American commonly pause on its borders. The Papago prefers to live where other peoples famish; he is able to do so by reason of the remarkable adjustment of his habits, his food and raiment, his industries, his social organization, to a peculiar assemblage of conditions; and thereby the tribe acquires a peculiar interest.

Three and a half centuries ago Spanish explorers came in contact with the Papago Indians, and over two centuries ago established missions among them, especially in the eastern and better-watered portion of their territory. With hardly an exception, the invaders found the tribesmen fearless and dignified, yet kindly and hospitable; and this character has been maintained until the present time. The Papago chiefs met the Spaniards as peers, and interchanged courtesies and commodities, yet the exchange went on with a certain reserve. Through the exchange, the Papago acquired burros and horses, goats and kine, sheep and dogs, as well as a number of garden and field plants and a variety of agricultural arts. They also adopted gradually the costume of civilization, and apparently by reason of certain similarities (perhaps superficial) in the ceremonials, they viewed favorably and in some measure adopted the imported doctrines. They also adopted, albeit slowly and cautiously, the adobe architecture, with the architectural type previously borrowed by Spain from the desert borderland south of the Mediterranean. In return, they gave the Spaniards temporary sustenance, and were among those who enriched the civilized world by the gift of corn and other indigenous plants, including the legume which

gave them name; and gradually a system of barter grew up under which the Spaniards acquired the means and arts of life in a desert region, the Papago meantime forgetting their arts of weaving, hand-culture of the soil, and other operations rendered needless by their new acquisitions. Here the commerce ended; the Papago refused, save in exceptional cases, to attach themselves to the Spaniards' households, refused to surrender their tribal autonomy, refused to intermarry with the whites, refused to countenance relations in which they would be subject to bondage or prevented from coming and going freely as the migratory bird; and, save for a partial and rather superficial assimilation of ceremonies and concepts, they clove unto and still retain their primitive philosophy.

Whether it be ascribed to peculiar environmental conditions or not, the fact remains that the Papago tribe is characterized by exceptional force and stability of character. For over three centuries they have been known among white men (albeit a few only) as peaceful yet brave, hospitable yet independent, amiable yet dignified; and they have equally been noted as industrious and virtuous. When attacked, or in reprisal, they have always gone forth to meet the Apache, even in greatly superior numbers, and have protected their fatherland against all marauders. They scorned control by alien races, and are today known in Mexico for their constant and consistent avoidance of peonage, under which neighboring tribes were ground. They have engaged in mining in desultory fashion at various times, but have never been coaxed or coerced by alien capital; and almost without exception they have maintained the purity of their blood, despite the pressure of frontier life and conditions. Neighboring peoples, including most of the kin-tribes, have been assimilated or modified; but the greater proportion of these people of the desert are still known as "wild Papago" or "roaming Papago," and their habits and modes of thought are little changed since the white man came."

While the Papago Indians have been notably stable during three centuries of contact with alien races, there is reason for considering them descendants from a people of superior aboriginal culture. Throughout much of Papagueria, especially in Mexico, there are abundant relics of a prehistoric population and agriculture. The ruins, like the first settlements, are found in the moister localities, in the foothill gorges and in the broader valleys, their distribution indicating that the prehistoric people

pushed further into the valleys than the historical population. The prehistoric relics comprise ruined houses and villages, weathered to inconspicuous mounds, but known from occasional foundation remnants to have been constructed, at least in part, of a mixture of adobe and coarse pebbles; abundant fragments of pottery, finer in texture and decoration than that now made by the Papago; extensive acequias and other irrigation works; small corrals or stock yards containing reservoirs; dominating structures in each considerable village, in the ruins of which the finest pottery is found; and well shaped and polished stone axes, pestles, mortars, etc. Comparison of these vestiges with the works of the modern Indians indicates that the prehistoric population was the more advanced in industries and much the larger in numbers. The ancient agriculture, particularly, occupied a higher plane than that of the present; for the prehistoric farmers constrained and restrained the running waters to the needs of their kind, while the modern Indians chase and seek the waters just as they chase game and seek wild fruits. By reason of the control of the waters the fruitfulness of the valleys was undoubtedly multiplied, and large tracts of the desert must have blossomed and borne fruit at the behest and for the benefit of the primitive husbandmen. The ancient acequias were much larger than the modern ditches—*e. g.*, in Arivaca valley, in southern Arizona, the main prehistoric acequia was raised so as to flood the entire bottomland, was lined almost continuously with houses, and was 150 feet wide, while its modern representative, introduced by Caucasian skill, is a simple ditch excavated below the surface and 8 or 10 feet wide. The ancient villages are much more numerous and extensive than the modern Indian, Mexican, and American villages combined. The great number of habitations might be ascribed to successive occupation and abandonment were it not for the testimony of the irrigation works; for the old ditches were not only more extensive, but were carried further up the sides of the valleys in such manner as to permit the synchronous cultivation of larger areas than are now cultivated, and in a manner, moreover, which would have been extravagant and useless unless a large population in each valley was dependent thereon. The dominant structures in each village suggest a cult and social organization somewhat different from that of the modern Piman tribes, whose villages are without council-houses or temples, the ancient structures corresponding in some measure with the "casas grandes" found in Arizona,

Chihuahua, and elsewhere, and with the ceremonial places of the pueblos. In central and southern Papagueria "trincheras," or entrenched mountains, are occasionally found in and alongside the better watered valleys in the vicinity of ruined villages. These works are more or less inaccessible buttes or mesas, whose precipices and slopes are extended and reinforced by artificial walls of loose-laid stones, while on the easier slopes the walls are multiplied and bastioned in such manner as to convert the eminences, when protected by a limited force, into impregnable fortresses. Some of these places of refuge are without traces of permanent habitations or storehouses, and also (what is still more significant in this arid region) without sources of or reservoirs for water, so that they could have been occupied only temporarily or interruptedly; while elsewhere (*e. g.*, the great fortified buttes near San Rafael de Alamito, in Altar valley) there are remains of permanent domiciles. In brief, the archeology of Papagueria indicates that during prehistoric times the foothills and valleys had a considerable agricultural population, supported by means of a highly developed system of irrigation; that this population was peaceful and highly organized socially; and that, through the development or invasion of predatory enemies, the peaceful people were driven to seek refuge, and later, as the irrigation works were destroyed, were either annihilated or driven into the desert to enter into enforced communality with the meager flora and fauna and find protection in the bitter inhospitality by which all human enemies were held at bay. There is accordingly a strong probability that the modern Papago Indians are descended from the more cultured inhabitants of this purview of the land of the Montezumas.

The modern Papago is of medium or slightly below medium stature, the women being apparently relatively larger than the men. There is a tendency toward heaviness of feature, particularly among the more sedentary groups toward Gila river; with this exception, the features are more delicately moulded and the expression more vivacious than among neighboring tribes. The men cut the hair, rarely about the neck, commonly shingled more or less closely; the women allow the hair to grow long, and frequently braid it or arrange it in pendent tresses. The color of the skin is somewhat variable, but of the usual coppery cast. Among the adults, and more rarely among the children, a blotched appearance is not uncommon, and many

faces are pitted by smallpox. Usually the body and extremities are rather slender, but lithe and vigorous.

Of late the men are addicted to intemperance in smoking and drinking; most of them smoke cigarettes whenever they can be obtained, and nearly all drink mescal (an alcoholic liquor distilled from the mescal or agave plant) inordinately whenever opportunity offers—*e. g.*, during a stay of three days at Poso Verde, near the international boundary in Sonora, only two men were found not continuously intoxicated. It seems certain that the natural features and probable that the stature and other physical characters of the men have been injured by this excessive use of narcotics and stimulants. The women are largely free from these vices.

Among both sexes the dignified hospitality and reserve noted by the Spaniards three centuries ago persist. Papago etiquette demands an interval of affected unconsciousness of the presence of a visitor, whether from neighboring village or strange lands; so the visitor enters the village and rides to the very threshold of a leading tribesman without receiving other attention than furtive glances from the children; he dismounts in the shade of the vah'-toh (which takes the place of the porch or balcony of civilization), and rolls his cigarette nonchalantly as in the desert. In the course of five or ten minutes the head of the house for the time, be it man, matron, or maid, addresses a casual remark to him. At first the conversation is fitful, but gradually the intervals of silence shorten, the host or hostess turns attention from the occupation of hands or eyes toward the visitor, and cordial relations are established. If the visitor is an old friend, the interval of ceremonious silence is shortened and is sometimes terminated by friendly greetings, though commonly these are reserved for the parting; if a white man of distinguished bearing, a seat is placed, or a mat spread, for his use soon after his presence is recognized, and a melon or some other article of food, or a bowl of water, is placed within his reach. The visitor may then extend a general invitation to the household or village to eat with him in his camp, and may rest assured that, howsoever slender his larder, there will not be too many guests, and will find, moreover, that even after they present themselves at the camp, each guest must be personally invited once, twice, or three times (the custom varying in different villages) before he will be seated. White visitors having no appearance of distinction are treated with less consideration, and are usually expected to help them-

THE CHIEF'S HOUSE, FRESNAL (ACCULTURAL STRUCTURE OF ADOBE, WITH VAH'-TOH ON THE RIGHT)

selves to water or food, while the Indians are correspondingly unceremonious in the visitors' camp, though almost without exception the courtesy of the Indian exceeds that of his visitor.

Throughout the tribe the man is the hunter, the herder, and the chief laborer in the field; the woman is the potter, the water-bearer, and the collector of easily accessible wild food supplies. The children are vivacious and happy, the boys playing with the riata or lasso, with which they make miserable the lives of burros, calves, and dogs, or with the bow and arrow, while the girls play at household operations or troop away after mesquite beans and prickly pears. Many of the men are expert riders and ropers, quickly subduing the most vicious buckers among their bronchos, and almost invariably looping their riatas about the horns, neck, fore foot, or hind foot of stock, at will, at the first throw.

Living a hard life as they do, the Papago Indians are subject to a variety of accidents. Until within a generation they were almost constantly engaged in defensive warfare against the Apache, and nearly every village still has its battle-scarred veterans; vicious bronchos and crabbed bulls score a victim now and then; drunken brawls frequently have fatal endings; often

the only water obtainable for weeks and months is a reeking spume of organic poison; above any and even all of these is the ever-present danger of the drying up of the spring, the tinaja, or the rivulet on which the villages or travelers depend, and the quickly consequent delirium, ending in the most terrible of deaths. Yet despite all their hardships and dangers, the Papago appears to live long; few invalids are seen, old men who clearly remember the events of 50 or 60 years past are found in nearly every village, and withered crones, shrunken to living skeletons, yet able to perform the most arduous of domestic duties, are surprisingly numerous. While statistics are lacking, there is reason for supposing that the average expectation of life in the desert is greater than in more favored lands.

A considerable agricultural reservation has been assigned to the Papago Indians, including the old Spanish mission of San Xavier, in Pima county, nine miles south of Tucson, Arizona. This reservation is on the northeastern margin of Papagueria. About a hundred families are collected on the reservation, where they are judiciously controlled by a sub-agent of the Indian Bureau. The reservation Indians are supplied with vehicles and agricultural implements, and occupy themselves in the planting and harvesting of corn, small grains, beans, melons, squashes, etc., for home consumption and for the Tucson market; the women manufacture pottery in considerable quantities for the market, as well as for domestic use. Most Indians on the reservation continue to occupy primitive houses, and the culinary and other domestic operations are preëminently primitive; but their habits and modes of thought are so far changed that they are regarded as alien or semi-alien by the great majority of the tribe. The southern portion of Papagueria is somewhat more diversified as to surface than the main body of the district, and is somewhat better supplied with water; accordingly the Yaki and other tribes, as well as Mexican stockmen and farmers, and Mexican or foreign miners have pushed into the region; and thus the primitive holders of the land have been in large part displaced and remain only in scattered rancherias or villages, sometimes adjoining Mexican towns, sometimes isolated. In general the permanent part of the Papago population in Mexico may be considered stationary; and the families have acquired Mexican customs and are affiliated commercially, though seldom in blood, with their neighbors. Perhaps a fifth or a quarter of the Papago Indians are either located on, or in some way tributary to, the reserva-

tion of San Xavier; about another quarter are on, or south of, Rio Altar or its tributaries in Mexico; the remainder or fully one-half of the tribe are roamers of the desert, living in a peculiar manner which is neither exactly nomadic nor exactly agricultural, but a unique combination of these modes of life. It is this half of the tribe—the "wild Papago"—that is of especial interest to the ethnologist.

During a considerable part of the year the "wild" Papago occupy rancherias or nominally permanent home villages; tributary to each rancheria there are usually several (sometimes but one or two) temporales, or temporary farm domiciles; and many of the families or family groups have winter domiciles, either for hunting or for pottery-making, in the mountains or settled valleys of Mexico.

So far as the meager water supply of Papagueria permits, the household gods are enshrined about permanent springs; but, since the family groups many times outnumber the continuously flowing springs, rancherias are frequently established about temporary springs, born of an exceptional succession of storms, or even about water pockets in the bottoms of barrancas, or ponds produced by single storms. Some villages in the eastern part of Papagueria were formerly located on fairly permanent, though slender, streams heading in the Sierra, but these sites have generally been taken by Mexican and American invaders. The rancheria includes a separate dwelling for each family, with one or more stock corrals, and, if the soil is fit, a few truck gardens adjacent to the houses of the more enterprising families. The dwellings are scattered; commonly each is several rods from the nearest neighboring domicile, and thus a village of fifty or more houses frequently extends over the greater part of a quarter-section of land. The dwelling comprises an enclosed house, with usually an adjacent shelter and a cooking circle a few yards distant. The typical house consists of a dome-shape framework of mesquite saplings, thatched with sacaton or other coarse grass, or sometimes with leafy shrubs or bushes, or even with cornstalks, the thatch being sewn to the framework with slips of yucca stipes. Such a house is circular or elliptical in plan, 12 to 18 or 20 feet across and 5 to 8 feet high; the roof portion is often flattened and covered with a layer of earth two or three inches in thickness. The doorway is a simple opening two feet or less in width and usually little more in height; sometimes a door made of sacaton lashed to

TYPICAL PAPAGO HOUSE

light sticks is used, but ordinarily the aperture remains open. There are no smoke-holes or window openings, and the interiors are begrimed and sooty. Sometimes the framework is made of mesquite posts and stringers, in which case the roof is commonly more flattened, more deeply covered with earth, and, to support the weight, the framework is reinforced by poles, which may be either ribs of the sahuaro (*Cereus giganteus*) or branches of the okatilla (*Fouquiera splendens*). Frequently the house is protected from the ravages of cattle and horses by an armature of thorny okatilla stems erected about it and attached by withes or yucca lashings. Sometimes the houses are rectangular, this form being probably accultural. The rectangular houses may be of adobe (sun-dried bricks), cajon (adobe mud, either mixed with stones or not, molded directly into walls), stone plastered with adobe mud, sacaton grass, okatilla stems and sahuaro ribs, or combinations of these. The adobe construction is undoubtedly derived from Mexican neighbors and has not been long in use; the adobe or adobe and stone structures are flat-roofed like the ordinary Mexican houses, covered with earth, and sometimes provided with rainspouts; such houses usually have smoke-holes, and in some of the eastern and southern villages they have rude chimneys with chimney-pots (ollas with broken bottoms). The doorway of the accultural house is usually five or six feet high, something over two feet in average width, but considerably wider at bottom than at top, and commonly extending not quite to the ground; doors are unusual, save in the more acculturized villages, when they are either carpenter made or composed of okatilla stems lashed together. The simpler rectangular houses grade in structure, material, and appurtenances into the primitive, dome-shape type. The adjacent shelter (vah′-toh) appears to be an innovation derived from Spanish contact; it consists of four, nine, or more crotched posts of mesquite, set in a rectangle and carrying stringers of mesquite or paloverde and cross-sticks of okatilla or sahuaro, sometimes thatched carelessly with sacaton, more frequently covered with leafy shrubbery, coarse sticks, etc, or with hides, bits of canvas, blankets, etc. The cooking circle or roofless house is primitive; it consists of a series of mesquite posts, four or five feet high, set in a circle four to six yards in diameter, connected save at one point (which serves as a doorway) by two or three horizontal binders, usually of mesquite sapling, to which a layer of sacaton grass is lashed. During fair weather—and nearly all days are

fair in Papagueria—culinary operations are performed in this airy structure; it is only during stormy weather that fires are built in the houses. Toward midday men, women, and children take refuge from the burning desert sun, whose rays are intense beyond imagining in humid lands, under the vah′ toh or in the house. At night the men usually sleep either out in the open or under the shelter, the women and children more commonly in the houses. It is to be remembered that the Papago house is primarily a place for storing properties and taking refuge from the sun, and only subordinately a protection from storm and cloud.

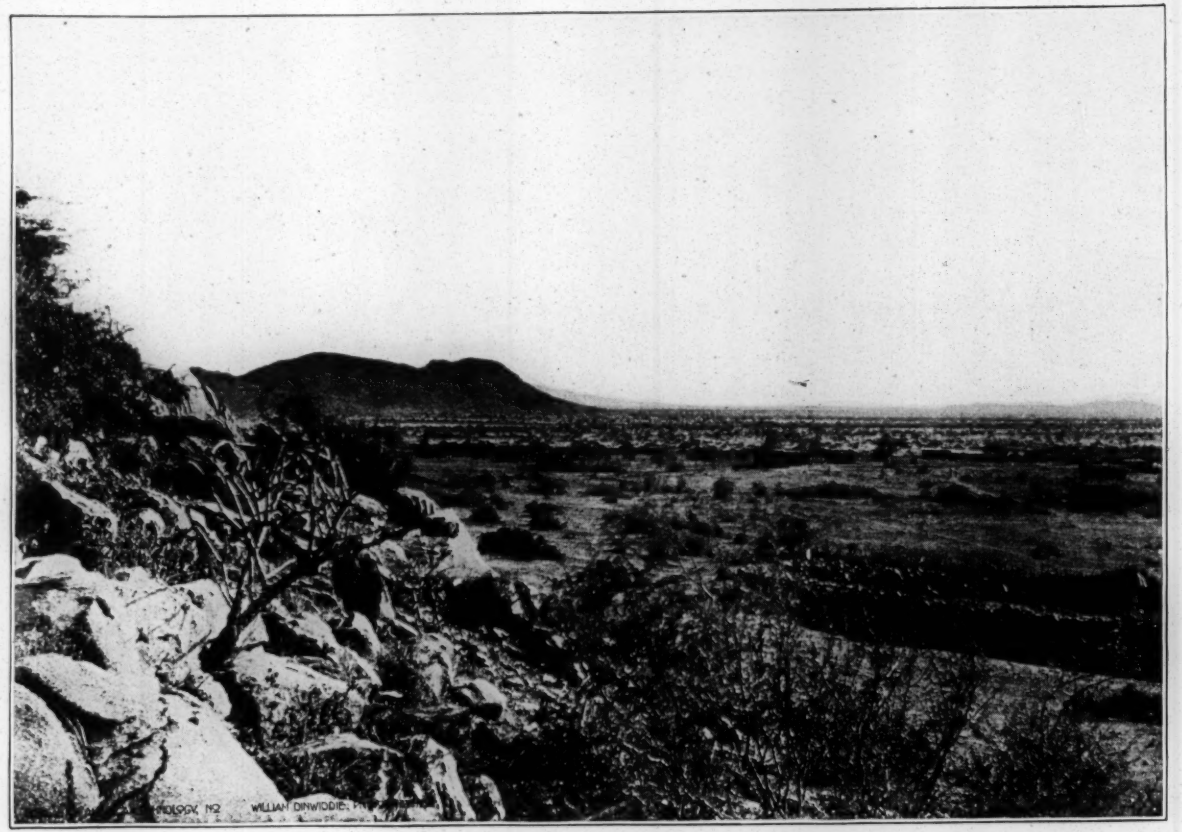
The corral is an accultural feature introduced with horses and cattle from Spain. Usually it is a double stockade of gnarled mesquite logs, filled in between with trunks and branches of mesquite and paloverde, sahuaro ribs, and okatilla stems, the whole lashed firmly with rawhide. Sometimes the wall is partly or wholly of stone, in the form of rubble laid loose. The corral is communal; it is the property of the village, though sometimes it is controlled by the chief or two or three head men, who permit their less energetic neighbors to make use of it. It is usually open, when horses and cattle are merely headed into it in order that they may be lassoed more readily than outside. When closed it is with a barrier of great logs, usually of pine brought down from the mountains, for nothing lighter will withstand a stampede of the half-wild stock.

The spring is usually protected by a corral, with a partition of stockade which prevents the cattle from miring in the deeper part of the pool. As the waters dwindle in the dry season or with a succession of dry years, the spring is gradually deepened and sometimes converted into a well from which the water is drawn, after the Mexican fashion, in bags, which may be made of the skins of oxen, with the aid of horses. A heavy rawhide riata attached to the bag passes over a cross-beam (rarely supplied with a pulley), and is given a twist or two about the pommel of the saddle by a horseman; or, if he rides the typical straw saddle of the Papago, the riata is passed about the breast of the animal and brought up over the withers, to be firmly grasped in the right hand. The spring corral is usually kept up. It is repaired and protected by cacti, poles, stones, and any other material; perhaps the most effective of all being the carcasses of bulls slain in the terrific battles at the water side, which become desiccated and mummified in the dry air into tenacious masses

of rawhide and bone, far stronger than wood; and no carcass is allowed to go to waste when the corral needs repair.

No council-houses or other public, ceremonial, or dominant structures are found in any of the villages, though there are sacred places near most of them, and sites of the events in their Book of Genesis in several places. The devotional instinct finds relief chiefly in pilgrimages to the sea and in a curious sea-cult half concealed under common-place phrases.

At the center of the typical grass house there is a fireplace, consisting of nothing save the ash-covered spot reserved for the purpose, with the three loose cobble-stones required to support the olla when placed on the fire; sometimes consisting of an annulus or circular wall of adobe mixed with ashes, 15 to 18 inches in diameter, and 6 to 10 inches high, open to the ground on one side. The metate—a slab of granular or vesicular stone commonly a little over a foot in width and perhaps two feet in length, bolstered up on cobble-stones or blocks of wood—and a grinding stone or two belong hard by the fireplace. About the walls of the house lie two or three beds consisting of agave-stipe mats, while between the beds are piled grain-filled or empty ollas, squashes, melons, and corn, with saddles, riatas, stray articles of apparel, and other domestic impedimenta, in such profusion as the season and family thrift permit. The cooking circle is like the enclosed house in respect to fireplace and culinary appurtenances, but the stores and other valuable property are kept in the house proper. When there is no cooking circle—and many, indeed most, houses in the large villages are without this feature—there is frequently a fireplace in the vah'-toh, and there the metate, the essential family nucleus, is set up. Hour by hour the housewife, kneeling at the upper end of this primitive nether millstone, drives the grinder back and forth with a persistent energy that the athlete might envy, producing meal or pinole at a hardly perceptible rate; the children cluster about within easy reach of admonition; unless otherwise occupied, the men recline near by, rolling and smoking cigarettes, and, between smokes, taking pinches of the toothsome pinole; the dogs lie near as occasional cuffs and objurgations allow, in enjoyment of the aroma and in the hope of a furtive taste now and then; and at irregular intervals, determined by the state of appetite or the quantity of meal, the daughter or daughter-in-law mixes a batch of dough, places a plate of tin or thin iron over the fireplace or olla stone, and with marvelous deftness molds, stretches, and bakes the



POSO VERDE: PAPAGO VILLAGE

dough into nutritious and wholesome tortillas—the staff of life of Mexican and Indian alike. Within the shelter stands a three-branched post of mesquite supporting a large olla of porous ware filled with water, deliciously cooled by the slow exudation and evaporation in the dry air. This family olla is kept filled by the women, generally the younger of the household, though sometimes by crones, who, at eventide or at other times if need be, go forth in trains to the spring or water hole, returning with huge jars balanced, not on the shoulder, as in Babylon of old and in eastern Mexico today, but on the head. In this way the water required for all domestic purposes, save the laundry, is transported to the houses. When garments require washing—and the Papago are a cleanly folk—they are taken to the waterside and rubbed with the hands and beaten with cobbles on a large stone, while the saponaceous lather of the soap agave is applied, and water is sprinkled or poured over them.

The temporale is much like the permanent domicile of the more primitive type, save that it is usually smaller in size, lighter in framework, and even more ephemeral in character; while around it or near by the narrow fields whose few acres are all but lost in the vast extent of the intermontane valleys. Sometimes the fields are open, when the watchers rely on their own vigilance for the protection of the growing crops; usually they are enclosed by flimsy fences of mesquite and cactus. There may be but a single field in a temporale, and that may be cropped but a single season, though usually there are half a dozen or more fields in a locality, and these may be used during several successive seasons; but the Papago husbandman is constrained by an intuitive geometry, and usually saves fencing by making his field elliptical or circular rather than rectangular; and in most villages line fences are unknown. The location of the temporale, like that of all other things human in the desert, is determined primarily by the occurrence of water, secondarily by character of soil. A favorite situation is the seaward terminus of the arroya on whose middle reach the rancheria is located; thither flows the unevaporated residue of the winter storm floods, soaking the soil and fertilizing it with a veneer of fine mud, just as the valley of the Nile is fertilized by the Nilotic flood; and even if the storm freshet fails on the surface its waters permeate the subsurface sands within reach of the roots. Sometimes the temporale is located where a single great deluge, the product of a single storm, soaks the soil and vivifies the plants into a short-lived oasis;

sometimes the hut of the temporale is pitched and its field laid out alongside a temporary water hole, cut out by a single storm or during one wet season, far out on the plain. When the temporale is by a valley water hole, the husbandmen share the precious liquid with their herds of stock, that daily trample through it and fight to the death on its brink, and with the myriads of insects, great and small, that swarm about and within the water to revel in its liquidity or consume its filth, while the pool seethes in the sun and festers and putrifies into foul-odored mud. When the subsurface sands are water-bearing, sometimes wells are sunk; and again the temporales are without water save as it is carried perhaps for a dozen or score of miles in ollas swung over the backs of burros or carried on the heads of withered crones.

Usually the temporale of each family is occupied only by a young or middle-aged couple, sometimes by a sire and two or three boys, again by most of the family. While the women grind meal on the metate or scour the valley for fruits and material for baskets, the men plow or fence their field and plant their seeds and harvest their crops in season, the produce, except such as is consumed on the ground, being transported to the rancherias. But the season is a variable one; the season for planting is the time of storm or freshet, come when it may; and the season of harvest is the time of maturing or ripening of the produce, be it May or September, for advantage is taken of the summer freshet as well as of the winter one. If the temporale is used but a season or two, the domicile may be little more than a bower of mesquite bushes; and when the temporale is long and numerously occupied and the fields are grown to 5 or 10 acres in extent, such bowers are occasionally erected here and there in the fields or about the fences, in order that the watchers may find shelter, or the harvesters may repose in their shadow. In some cases the rancherias and the temporales approach and even merge; and some groups have no temporales or other fields except the meager patches scattered about the rancheria, while other groups have fresh temporales and no permanent rancherias, their winters and autumns being spent in Mexico or in neighboring rancherias among which the individuals scatter when not engaged in agriculture.

Somewhere in the vicinity of nearly every town and village in northern Sonora, and of many of those in the central and southern part of the state, there is a Papago pueblo which is commonly occupied during the winter and abandoned or left in charge of one

POTTERY-MAKERS AT WORK IN TYPICAL BOWER

or a few families in summer. Then as the migratory birds fly southward, the Papago clans of Arizona drift after them in irregular fashion; the pueblos are gradually filled, chiefly by families in which there are many women. Other families migrate in similar fashion, save that, instead of locating in the pueblos, they scatter through the mountains to hunt deer and other game. The hunter is usually accompanied by his wife, and perhaps by children, and sometimes several hunters coöperate; their method is to build temporary lodges, usually of the boughs of trees, related in form to the typical domiciles of grass, though frequently the trunks and low-hanging branches of mesquite or oak trees take the place of part of the ordinary framework, and the hunters normally wander but a little way from their lodges, preferring to await the coming of game rather than to seek it afar. Much of the small game is consumed by the hunter and his family, but deer and some smaller animals are taken down the mountain sides to the Mexican towns and sold or bartered. Meantime the Papago women in the pueblos dig clay and make pottery, which they also sell or barter to the Mexicans. Thus many Mexican villages are supplied with venison and ollas at small cost, while the temporarily immigrant Papago obtain money and goods, albeit in small quantities, and develop a simple commerce. At the same time they acquire something of the Mexican culture, habits of life, fashion of dress, language, and religion. The pueblo house is usually of adobe, and in no way different from that of the neighboring Mexican family. The metate is usually obtained by barter, and is frequently a shop-made article like that of the more pretentious Mexicans; the skirts and rebosas of the women are in no way distinguishable from those of the señoras and señoritas, and the women and some of the men attend the church fiestas and avail themselves of the opportunities for confession and baptism and even formal marriage, while the men outherod their Mexican mates in mescal drinking. It is largely through this winter association of the Papago with the Mexicans during many generations that the desert tribe has been acculturized and in part Mexicanized; and it is partly by reason of this prior association and alien acculturation that it is so difficult for the Papago to affiliate with the American pioneers and institutions.

So the life of the Papago is a round of migrations and wanderings, largely in search of the means of subsistence, of which the first and the second and the third are water, *water*, WATER—water

to alleviate his own thirst in the sun-parched deserts, water to sustain his horses and burros and kine, water to vivify the plants of which man and his creatures eat. While the late winter rains are bringing verdure to the mountains and sending slender streamlets into the arid valleys, the tribesmen gradually return to their rancherias, remove the barriers of stones and sticks from their doorways, and await the fit moistening of the soil at the temporales. At the proper day they go forth to plow and plant, and watch the rapid maturing of the crops. With the harvest time the temporale is normally abandoned and the produce transported to the rancheria. At about the same time the fruits of the sahuaro and other cacti ripen, and soon afterward the beans of the mesquite mature, and these uncultivated crops are in like manner gathered and stored. Then follows a season of idleness and feasting, interrupted by primitive ceremonial and attendance on Mexican fiestas, perhaps scores or hundreds of miles away; and as autumn advances, the homes are again deserted by a part of their inhabitants, who wander to other rancherias to participate in the votive festivities or set out on the annual migration southward.

GOMEZ AND THE NEW YORK GULF

Some interesting conclusions in regard to early American discovery seem to result from the study of an old Spanish map published by Mr Harrisse in his "Discovery of North America," p. 241. Writers on early cartography have identified the Rio de San Antonio of early maps with the Hudson river and found evidence thereby that the Spanish were familiar with that stream long before Hudson himself came in 1609. The evidence of Mr Harrisse's map tends to disprove this claim. The map was made to accompany the "Islario Generall," written by Alonzo de Santa Cruz in 1560, and Mr Harrisse gives the opinion that it is based upon the lost Chaves map of 1536.

Whatever knowledge of the North Atlantic coast from Chesapeake bay to the Penobscot the Spaniards may have had in 1536 depended, so far as we know, on the explorations of Gomez in 1525. His exploration had been an official one, resulting, presumably, in fairly accurate data, which would naturally have been used for the official Chaves map seen and described by Oviedo in 1527, but now lost. Efforts to trace Oviedo's descrip-

tion in the unofficial Ribero-type maps of 1527–'29 have been unsatisfactory. So also have been the efforts to find correspondence between the Ribero-type contours and the real American coast-line. The significance of the Santa Cruz map, therefore, lies in this—that it alone among early maps corresponds to Oviedo's description of the Chaves map and should indicate the exact extent of Gomez' discoveries by an actual resemblance to the American coast.

In a single feature does the Santa Cruz map seriously depart from Oviedo's data. Its latitudes are all marked one degree farther north than Oviedo gives them. But this question of latitude brings out another curious point. The Santa Cruz map purports to represent the American coast from 38° to 45°, yet it obviously does not represent the coast-line of that space, while it does resemble quite well the coast of New England from Nantucket to the Penobscot. This discrepancy of latitude may be set aside for the moment. The real test of the map is its resemblance to the New England coast. Beginning at the north, the islands of the Maine coast are shown and the legend "montañas" is placed just where Kohl says that mariners can see the distant peaks of the White mountains. Turning then southwest and south, the coast makes a deep indentation suggestive of Massachusetts bay, turns sharply to a north-pointing cape like Cape Cod, and then southward again as if to the point of Nantucket, where it makes a sharp turn to the westward before merging in the land discovered by Ayllon. In its relative proportions the Santa Cruz map corresponds with the New England coast, except in an unusual lateral extension of the Maine coast. The map is one such as would be expected from a sixteenth century official explorer—not true in all details, but fairly accurate in general features.

Under this interpretation of the map the Rio de las Gamas of Gomez becomes the Penobscot, Cabo de Santiago becomes Cape Cod, Cabo de las Arenas becomes the Point of Nantucket, and the Rio de San Antonio becomes, not the Hudson, but the Merrimac or Salmon Falls. It is interesting to note how the inaccuracy of the Ribero-type maps has transferred the east-pointing Cabo de las Arenas of Gomez to the place of the north-pointing Cabo de Santiago. That the island of Nantucket is made one with the mainland is natural, since Gomez, aware of the shoals and shallows of that region, would hardly have tempted fate by running close to shore, but, passing to the southward, might have remained unaware of the passage between it and the main.

If, then, the Santa Cruz map from Cabo de las Arenas northward represents New England, where shall we look for the Gulf of New York? Ayllon is not supposed to have explored north of the latitudes of Virginia. If Gomez explored the Gulf the map constructed from his data should show it, but from Cabo de St Juhan, Ayllon's northernmost discovery, the coast extends north-north-east 30 leagues to Cabo de las Arenas without a hint of the peculiar coast features so carefully noticed north of Arenas. The inference seems unavoidable that Gomez merely rounded Nantucket and then turned homeward; otherwise he would hardly have failed to note some of the peculiar features of the coast west of Nantucket.

While the New York gulf thus seems unknown to the Spanish cartographers who depended on Gomez' data, the Spanish maps, nevertheless, confess no gap whatever in Spanish knowledge of the coast. It is a curious and perhaps unique feature in early cartography that seems to find its best explanation in Spanish desire to leave no flaw in a claim of possession of the entire coast by right of discovery. Certainly Gomez would hardly have erred so much in the taking of latitudes, nor does there seem reason for deception on his part of the home government. The curious point is the conscientious way in which the introduction of false coast-line was avoided by the falsification of latitudes.

L. D. Scisco.

University of Michigan.

WELLMAN POLAR EXPEDITION

Owing doubtless, in large measure, to the ambition of Arctic explorers to traverse the unknown regions about the North Pole before the close of the present century, there is an activity in polar exploration that is altogether unprecedented. With one of the expeditions from the United States—that in charge of Mr Walter Wellman—the National Geographic Society was recently asked to coöperate (1) by a formal approval of the aims and purposes of the expedition, (2) by the appointment of a committee to advise with the leader as to the scientific work to be undertaken, and (3) by the contribution of a sum of money in aid of the expedition, with the condition that, in the event of the expedition being successful, the amount so contributed should be refunded. After full consideration the Board of Managers

decided to coöperate, in some measure, with this expedition, and a committee, consisting of President Alexander Graham Bell, Gen. A. W. Greely, U. S. A., Prof. G. K. Gilbert, Dr C. Hart Merriam, Commodore George W. Melville, U. S. N., and Prof. Simon Newcomb, was appointed to advise Mr Wellman concerning the scientific work to be undertaken. This committee drafted a statement indorsing the aims and purposes of the expedition, and suggested the addition to the exploring party of three scientific observers, a suggestion that was promptly acted upon.

The Board has also undertaken to make a financial contribution to the expedition, with the understanding that in the event of the amount so contributed being refunded it shall be applied to a permanent fund for research. Subscriptions to the amount of one thousand dollars have been received from members of the Board of Managers and of the Society in general, and have been applied to the purposes of the expedition. Further contributions, from one dollar upward, may be sent to the Treasurer, Mr Henry Gannett, U. S. Geological Survey.

Mr Wellman and his party sailed from Tromsö on Sunday, June 26, in the S. S. *Frithyof*. Four days later, when in the White Sea, Mr Wellman wrote President Bell a letter, of which the following is an abstract:

"We expect to be at Archangel, where eighty dogs are waiting for us, on Saturday. The *Frithyof* is a good steamer, very strong and well equipped. In only one particular is she a disappointment—she does not steam as many knots an hour as had been represented to us. Still she is fast enough for the work. The reports from the ice are that it is a very unfavorable year, but my experience is that such reports do not count for much. A day or two of different wind may change conditions radically. In less than ten days we expect to be at the ice to see for ourselves.

"The only financial affair now worrying me is that we have not the funds for a steamer to come after us next year. In all probability it will not be necessary to hire a steamer specially, as there will be other ships going to Franz Josef Land. This matter is left in the hands of Consul Andrew Aagaard, of Tromsö, Norway, a most estimable gentleman. I have asked him to communicate with my friends in America in good season; and while I have not the slightest idea it will be necessary to hire a ship, if it should be I hope my friends will stand by us. Even if a ship is needed, it will not be very costly, as it may start later in the year than we are going.

"Our party consists of nine—four Americans and five Norwegians. Prof. Gore does not go to Franz Josef Land with us. Instead he goes to Spitzbergen. He was afraid he might be too long delayed in getting back from the former region. I am pleased with all the men, and we shall do our best to give you good news from us next year."

The latest advices are that on July 11, when in latitude 77° N. and 170 miles south of Franz Josef Land, the *Frithyof* found heavy pack-ice barring the way. She afterward proceeded westward to Prince Charles Land, to the east of Spitzbergen.

PROCEEDINGS OF THE NATIONAL GEOGRAPHIC SOCIETY, SESSION 1897–'98

Special Meeting, February 28, 1898.—President A. Graham Bell in the chair. Mr Bailey Willis gave an illustrated lecture on the Appalachian Region, describing the influence of the topography upon the migrations into and through the great valley of Virginia.

Special Meeting, March 4, 1898.—President A. Graham Bell in the chair. Mrs J. Howard Gore gave an illustrated lecture on Picturesque Sweden.

Special Meeting, March 7, 1898.—President A. Graham Bell in the chair. Rev. Randolph H. McKim, D. D., gave an illustrated lecture on Tidewater Virginia in the Olden Time.

Regular Meeting, March 11, 1898.—President A. Graham Bell in the chair. Mr F. V. Coville gave an illustrated lecture on The Cascade Mountains of Oregon.

Special Meeting, March 14, 1898.—President A. Graham Bell in the chair. Mr Edward Eggleston delivered an address on The Development of the Early Colonies and the Influence of Geographic Environment upon the Character of the Population and their Industries.

Annual Reception, March 16, 1898.—The Annual Reception of the Society was held in the new building of the Corcoran Gallery of Art, from 8 to 10 o'clock p. m. President A. Graham Bell, with the ladies of the Reception Committee, received the members and guests of the Society, to the number of 700.

Special Meeting, March 18, 1898.—President A. Graham Bell in the chair. Capt. Z. L. Tanner, U. S. N., gave an illustrated lecture on Bering Sea and the Explorations made during the Voyage of the Steamer *Albatross*.

Special Meeting, March 21, 1898.—President A. Graham Bell in the chair. Hon. John R. Procter, President of the Civil Service Commission, gave an illustrated lecture on The Blue Grass Country of Kentucky.

Regular Meeting, March 25, 1898.—President A. Graham Bell in the chair. Col. F. F. Hilder delivered an illustrated lecture on The Afghan Frontier and the Punjab, after which Mr Hira Singh Puri made an address on the Sikh people.

Special Meeting, March 28, 1898.—President A. Graham Bell in the chair. Judge R. S. Taylor, of Fort Wayne, Indiana, gave an illustrated lecture on The Lower Mississippi River.

Special Meeting, April 1, 1898.—President A. Graham Bell in the chair. Professor Angelo Heilprin, President of the Philadelphia Geographical Club, gave an illustrated lecture, entitled "Across the Atlas Mountains and into the Sahara."

Special Reception, April 2, 1898.—A Special Reception in honor of Capt. Charles D. Sigsbee, U. S. N., was held at the Arlington Hotel from 9 to 11 p. m. About 1,500 members and guests of the Society were present, including the President of the United States, the Vice-President, members of the Cabinet, Diplomatic Corps, and officers of the Army and Navy.

Special Meeting, April 4, 1898.—President A. Graham Bell in the chair. Mr W J McGee gave an illustrated lecture on the Prairie States.

Regular Meeting, April 8, 1898.—President A. Graham Bell in the chair. Mr F. H. Newell gave an illustrated lecture on Mount Rainier.

Special Meeting, April 11, 1898.—President A. Graham Bell in the chair. Mr G. K. Gilbert gave an illustrated lecture on The Great Interior Basin of the United States.

Special Meeting, April 15, 1898.—President A. Graham Bell in the chair. Miss Annie S. Peck gave an illustrated lecture, entitled "A Visit to Mexico, including Ascents of Popocatepetl and Orizaba."

Special Meeting, April 18, 1898.—Mr W J McGee in the chair. Professor Israel C. Russell, of the University of Michigan, gave an illustrated lecture on The Great Lakes and Lake Region.

Regular Meeting, April 22, 1898.—Mr W J McGee in the chair. Proposed amendments to the by-laws were presented in writing and read by the Secretary. Mr Gifford Pinchot gave an illustrated lecture on The Olympic Forest Reserve.

Special Meeting, April 25, 1898.—Mr W J McGee in the chair. Professor W. H. Brewer, of the Sheffield Scientific School, Yale University, gave an illustrated lecture on The Forest States, Park Reservations, and Forestry Laws.

ELECTIONS.—New members have been elected as follows:

February 4, 1898.—Frank Boteler, C. W. H. Ellis, Mrs J. Kerr, Mrs N. R. Mullin, Miss Sarah Fuller, Miss Caroline A. Yale.

February 25.—Col. Wm. S. Brackett, Mrs T. L. Cornell, Horace S. Cummings, O. P. Maxson, M. D., Frank Julian Price, W. H. Singleton, G. F. C. Smillie.

March 4.—Rafael Garcia y S. Tacio, James M. Hubbard, Paul M. Hubbard, Chief Eng'r Harrie Webster, U. S. N.

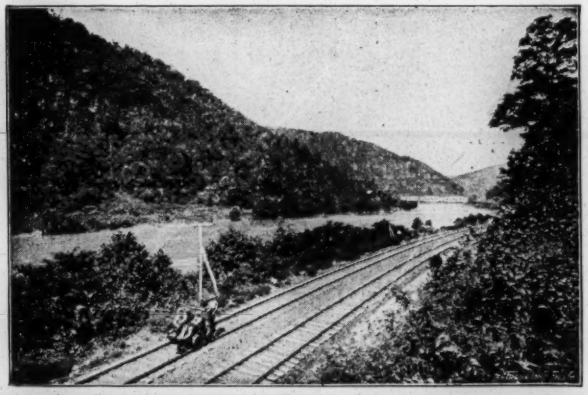
March 25.—Professor O. P. Morton.

April 1.—A. A. Anderson.

April 8.—Jas. E. Fitch, Laurence Sands.

April 15.—Professor Pomeroy Ladue, Mrs Ellen Laird, Lieut. J. A. Shipton, U. S. N., Grant Squires.

To be completed in the September number.



CHESAPEAKE & OHIO RY.

THE F. F. V. LIMITED is one of the finest trains hauled over any railway track in America. It runs solid between Cincinnati and New York, the route from Washington being over the Pennsylvania system. It has every modern convenience and appliance, and the dining-car service has no superior if it has an equal. The road-bed is literally hewed out of the eternal rocks; it is ballasted with stone from one end to the other; the greater portion is laid with one-hundred-pound steel rails, and although curves are numerous in the mountain section, the ride is as smooth as over a Western prairie.

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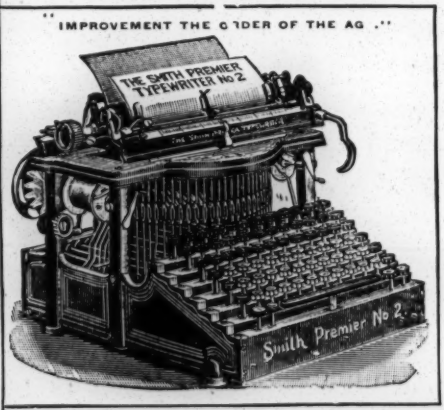

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